bric. It is then to be bleached on the grass, and not with destructive acids. Each piece to be aromatised when necessary, by steeping in spirit of vinegar twenty four hours, and prepared for use.

Observations. Much of the system of quackery, now so common, may be noticed in this specification. "The purest and choicest cotton wool," "woven by an apparatus costing from £.20,000 to £ 25,000" is a high sounding profession, calculated to raise a prepossession in favour of the peculiar manufacture under the patent, and to deter from all competition, or attempts at imitation. It is to be bleached without the use of acids, to humour popular prejudice, against the improvements in the new mode of bleaching, and then the aromatizing with the spirit of vinegar is added, to complete the plan to operate on the credulity of John Bull.

B.M.M.

Method of preparing Colours for dyeing Cotton and linen Goods, which may be easily washed out, and replaced by others. By M. Hermbstaedt.

(From the Annales des Arts, &c.)

The method of preparing these colours is simple and cheap; they are much used in Germany, where they are called *waschfarben*, or washing colours. The base is a good white starch, which may be combined with any colour whatever, in such a manner as to form a compound, that can be dissolved in warm water without being decomposed. But although starch forms the base of all these colours, a particular process is necessary to prepare each of the different colouring matters that are to be combined with it, which we shall give as follows:

1. *A new Blue.*—Grind some indigo of Guatimala to an impalpable powder; then pour four ounces of burning oil of vitriol into an earthen pan, and put to it an ounce of the pulverized indigo, by degrees, and always in small quantities; while the indigo is being thus incorporated with the oil of vitriol, the mixture must be well stirred at each fresh addition of the powder with a stone pestle, until the whole liquid mass becomes of an uniform blackish blue colour. By thus mixing indigo with oil of vitriol, the mixture heats itself, exhales a sulphureous smell, and a slight fermentation will be perceived. As soon as the fermentation ceases, the vessel must be closely covered, and placed for twenty-four hours in a situation moderately warm, in order to give time for the acid to dissolve the indigo entirely.

When the dissolution is effected, the liquid must be diluted with ten times its weight of pure water; after which it is exposed to the fire in a copper vessel until it is nearly as hot as boiling water. Then soak in it some flocks of wool, well bleached, or pieces of white wool, in the proportion of eight ounces of wool to half an ounce of the dissolved indigo, expose the whole for twenty four hours to a moderate fire, of about 56 degrees of Reaumur. The wool acquires a very deep blue dye, almost black; and the remainder of the liquid is almost entirely deprived of the blue colouring matter, and appears of a dirty green colour. In this manner the wool absorbs the blue colouring matter of the indigo, by separating it from the heterogeneous particles that were combined with it.

The wool that has been thus dyed is put into a tub, and some pure river water poured on, being kneaded at the same time, until the water comes out quite clear and colourless; thus the heterogeneous and dirty parts are separated from the indigo, and the pure blue colouring matter remains with the wool. When this operation is terminated, a quantity of river or rain-water, equal to forty times the weight of the indigo and oil of vitriol, is boiled in a boiler: in this matter is dissolved as much crystallized natron as equals the quantity of indigo employed; the dyed wool is then plunged into it, and boiled until it has nearly lost all its colour. The wool when it comes out of the boiler is a blue grey, the liquid remains of a fine deep blue, and contains the colouring matter of the indigo pure and dissolved.

If, for instance, an ounce of indigo is dissolved in oil of vitriol, and the liquid evaporated until the weight is reduced to four pounds and a half, then strained through a linen cloth, in order to separate the foreign particles that may be mixed with it; after which, if this blue dye be left to cool, it is then in a proper state to be employed as a colouring matter to give a blue colour of starch.

If a *deep blue* is desired, the proportions must be half an ounce of indigo to a pound of starch; for a *middling colour*, a pound and a half of starch to the same quantity of indigo; and for a *light blue*, two pounds of starch to the same. The

starch must be put into a bowl, the blue dye poured on it, and the whole well rubbed together until the starch be completely divided, and uniformly combined with the dye. Lastly, the mixture must be left at rest until it acquires the consistency of a fine thin jelly; it is then dried in a warm air, and put away for use.

2. *To prepare a Blue Colour with Prussiate of Iron.*—A blue colour, similar to the preceding, may be prepared by employing instead of indigo, prussiate of iron, or Berlin blue. The last-mentioned must be of the best quality, and it is rubbed with water in a mortar until it is so far combined with it that it will not easily separate; afterwards the blue matter is left to deposit, the water is decanted off, and the matter is triturated with the quantity of wet starch that is necessary to make the shade of blue desired. This colour, which is very fine, is dried, and bears the action of the sun and air better than the preceding. It must be observed, however, that when the cottons that have been dyed with this colour are washed with soap, it always leaves a yellowish tint in the water.

3. *Citron Yellow.*—Weld, saw-wort, and turmeric, are employed in preparing this colour. One pound of the two first substances, or half a pound of the turmeric, if that root is preferred, are boiled with twelve pounds of water, in a copper boiler, until the liquid is reduced to a pound, which is then strained through a linen cloth. In this clear liquid two ounces of white starch are mixed with it, and rubbed until all its particles are well combined with those of the colour. This compound is then dried in the air.

4. *Orange Colour.*—Bixa orellana is preferred for this colour: an ounce of it is pulverized with half an ounce of pure potash; some river water is poured on it; and this mixture is digested in an earthen vessel, closely covered, for four hours, at a temperature of seventy degrees of Reaumur, and occasionally shaken.

The liquid obtained by this process is of an orange colour, which is strained through linen, and suffered to cool, and then incorporated with two pounds of starch. The whole is afterwards dried in a warm or temperate air.

5. *Green.*—This colour is composed of blue and yellow; in order to obtain it, a part of the indigo dye, described at No. 1, and as much of the yellow dye of No. 3, are mixed together until the desired colour is produced, which may be known by trying it on paper A pound of this mixed dye is dissolved with an ounce of alum; when the solution is cold, two pounds of white starch, are mixed and well incorporated with it; after which it is dried.

In this manner different shades of green can be obtained, according to the proportions in which the blue and yellow dyes are mixed.

6. *Olive.*—This colour is prepared by mixing the indigo dye No. 1, with the bixa orellana No. 4, until the desired shade is obtained; the necessary quantity of starch is then added, and the mixture dried.

7. *Red.*—This is prepared from Brazil wood or cochineal: if the first be preferred, a pound of scrapings of this wood must be boiled in a tinned copper cauldron, with twelve pounds of rain or river water, until the whole is reduced to two pounds. It is then strained through linen. Afterwards two ounces of alum are dissolved in three ounces of boiling water, to which is added six ounces of the decoction of Brazil wood, and the whole is left to cool. To this mixture three pounds of white starch are added, and well incorporated: then the remainder of the decoction of Brazil wood is poured on, and the mixture is stirred until it acquires the consistency of a thin jelly, when it is dried in the air.

8. *Crimson.*—Half an ounce of pulverized cochineal is tempered with water, and put into a tin vessel, containing two pounds of boiling water. When the whole is well mixed, it must continue gently boiling until the quantity of liquid is reduced to a pound: it is afterwards strained through linen, or a paper filter. In this coloured liquid half an ounce of alum is dissolved; and when it is cold, two pounds of starch are well incorporated with it; it is then left to dry in the air at a mild temperature.

Besides these two colours, other shades of red may be obtained.

1. By adding, instead of the alum, half an ounce of tin, dissolved in *aqua regia*, to a pound of the cochineal or fernambouc dye.

2. By mixing either of these dyes with a decoction of weld or turmeric, by which means yellow reds and coquelicot may be produced.

3. By mixing them in different proportions with the blue dye, this mixrure will produce different shades of violet and purple.

9. *Violet.*—Half a pound of scrapings of logwood must be boiled with six pounds of water in a tin vessel until the liquid is reduced to a pound and a half. This decoction is strained through linen, or filtered through paper. An ounce of tin dissolved in *aqua regia* is then added to it, two pounds of starch incorporated with it, and left to dry in mild air. In this manner the colours and shades may be multiplied and diversified in a thousand ways, by mixing the above decoction in different proportions, or by adding to it other colouring substances, in order to obtain dyes that may be combined with the starch.

Manner of using these Colours.

When any of these colours are used to dye wearing-apparel, furniture, &c. any quantity may be taken and tempered with fresh water, and afterwards dissolved in boiling water: into this the stuff must be plunged; which, with well rubbing, takes the desired colour, and acquires also additional body or solidity.

Method of drying Potatoes. By M. Parmentier.

[From the Bibliotheque Physico-Economique.]

Three ways have been proposed for this purpose, namely, to take from potatoes the superfluity of water which they contain, to destroy the principle of reproduction, and to reduce them to a farinaceous state.

The first of these methods is without doubt the most simple, natural, and expeditious, but unfortunately it is the most defective of all: it consists in cutting them in slices, exposing them to dry in a stove or oven, and afterwards grinding them to flour. But this much extolled method ought to be abandoned, for potatoes so prepared are not proper even for cattle.

When it is desired, therefore, to preserve a quantity of these roots, sufficient to last until the next crop, it is necessary that they should first be partly dressed; and after they have been peeled, sliced, and dried in a stove or oven, they acquire the transparency, hardness, and dryness of horn, they break clean, and the fracture has a vitreous appearance. I have sent them in this state to the colonies; and I have remarked that when brought back to France, no insects whatever have penetrated their interior substance. I induced the celebrated La Peyrouse to embark some of them, in order to judge how long they would retain their starch; but the fate of this unfortunate navigator deprived me of the knowledge I might have derived from that source.

Wherever the potatoes are deposited, which are thus dried, they keep without any change; they may be ground as they are wanted, and the flour which is a yellowish powder, similar to gum arabic, dissolves in the mouth, and communicates to water the consistence and taste of potato that has been cooked. I have called it *the poor people's soup*, from the very small expence for which it may be made. It is also to make gruel and rich porridge with it.

The indispensable necessity of cooking the potatoes previous to drying them, in order to preserve their nutritious quality, without any more waste than the loss of their superfluous moisture, is one of the first facts that I established in my work upon these roots, published in 1772, by order of government, and with the approbation of the faculty of Paris. It has occasioned in Germany many useful researches, and among others an instrument has been invented for mashing them after they are cooked. It is a cylindrical tube made of tin, which is pierced with small holes like a skimmer; from this root, softened by boiling and afterwards dried in a stove, a sort of vermicelli is produced. It has been proposed to substitute for dried potatoes soaked in water or previously boiled, a process, which is pretended to be more œconomical, which consists in slicing them and soaking them in water for eight days. But it has not been considered that if during this soaking the temperature should be a little more raised than accords with the season, the potatoes will ferment, become acid, lose their fecula, and contract a bad taste. It will be still necessary to employ the operation of drying. There is much less trouble, care, and risk incurred by preferring the process described above; it is besides more economical. Another method of preserving them practised when potatoes were less used, is to take them in a sound state, neither boiled nor bruised, and rasp or grate them, and sift them, the juice and